Stochastic modelling of convective storm hazard across Australia

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Severe convective storms generate significant community disruption and major financial losses each year. Almost no part of Australia is void of some level of convective storm risk; therefore it is important to understand exposure on a national level. This presentation will describe work undertaken to develop a national probabilistic risk model aimed at understanding the risk that severe convective storms pose to the community.

A coupled approach utilising reanalysis data (ERA-Interim), the Bureau of Meteorology's Severe Storm Archive (SSA), archived radar data and weather station records has (and is) being used to develop this model. In line with previous work on the topic, an approach of studying environmental indices developed from reanalysis-based pseudo soundings is taken to understand the relative frequency of environments conducive to storm activity across the country. By considering periods, and areas, within the SSA where a reasonably high level of confidence exists that observations are near complete, a regionally tailored approach of 'training' has allowed the sounding-based climatology to be converted into one that quantitatively estimates event frequency. To understand the spectrum of storm behaviour (i.e. speed and direction), upper level wind data has been extracted from the ERA-Interim database so that this information may be probabilistically assigned to synthetically generated storm events. Issues such as the assignment of storm impact footprints and regional biasing of genesis location are currently under investigation and shall be discussed further at the conference. Validation/calibration of the model against a statistical analysis of historic weather station data will also be explored and discussed.